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DRIZZLE VARIABILITY IN MARINE STRATOCUMULUS IN THE AZORES

Edward Luke, *Brookhaven National Laboratory*
Pavlos Kollias, *McGill University*

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ABSTRACT

The ARM Mobile Facility (AMF) has recently completed its operation at Graciosa Island in the Azores as part of a 21-month field campaign to study marine stratus clouds. The AMF instrumentation suite and location provide a unique opportunity to observe the properties of marine stratocumulus clouds, utilizing a variety of active and passive remote sensors, including a 95-GHz cloud radar, ceilometer, and microwave radiometer. Drawing from over 20 different case days from four seasons, we apply a novel technique that decomposes cloud radar Doppler spectra into separate cloud and drizzle constituents. Using the decomposed radar observations, the temporal and spatial variability, both horizontal and vertical, of intra-cloud drizzle particle size distributions (PSD—total number concentration, characteristic size and spread) are described. The variability of the drizzle PSD parameters is classified according to a number of controlling factors including cloud thickness, liquid water content, and turbulence. Evidence suggests that drizzle is omnipresent in marine stratocumulus clouds. Furthermore, our observations demonstrate that conventional radar-based approaches to detecting and characterizing drizzle are challenged.